

Large-Scale Demonstration & Deployment Projects

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Deactivation and Decommissioning Focus Area



LSDDP Philosophy

- **Demonstrate technologies in ongoing D&D projects at a scale convincing to the end user**
- **Demonstrate suite of innovative technologies side-by-side with baseline technologies**
- **Reduce the risk and liability associated with the first time use of D&D technologies**
- **Manage LSDDPs using a team of D&D contractors who are willing and able to transfer the knowledge and expertise to other sites across the complex**



LSDDP Definitions (Models A and B)

Model A

- **Demonstration of innovative/improved D&D technologies, and deployment of one or more technologies (demonstrated) at a non-host DOE site**
 - Contaminated material disposition
 - Hot Cell facilities
 - Storage & treatment facilities (remote inspection/ maintenance)

Model B

- **Multiple deployment of innovative/improved D&D technologies at a “host” site and other DOE sites (focusing on “under-utilized” technologies)**
 - Reactor fuel storage pools and supporting facilities
 - Tritium facilities



Large-Scale Demonstration and Deployment Projects

Active Projects

- Los Alamos TRU Oversized Metal LSDDP
- Los Alamos Tritium System Test Assembly LSDDP (Model B)
- Mound Tritium Facilities LSDDP
- INEEL Fuel Storage Canals and Underwater and Underground Facilities LSDDP
- INEEL Fuel Pools and Material Disposition LSDDP (Model B)
- West Valley Hot Cell LSDDP

Inactive Projects

- Chicago Pile 5 Research Reactor LSDDP
- C-Reactor Interim Safe Storage at Hanford LSDDP
- Fernald Plant 1 Uranium Processing Facility LSDDP
- Savannah River 321-M Fuel Fabrication Facility LSDDP

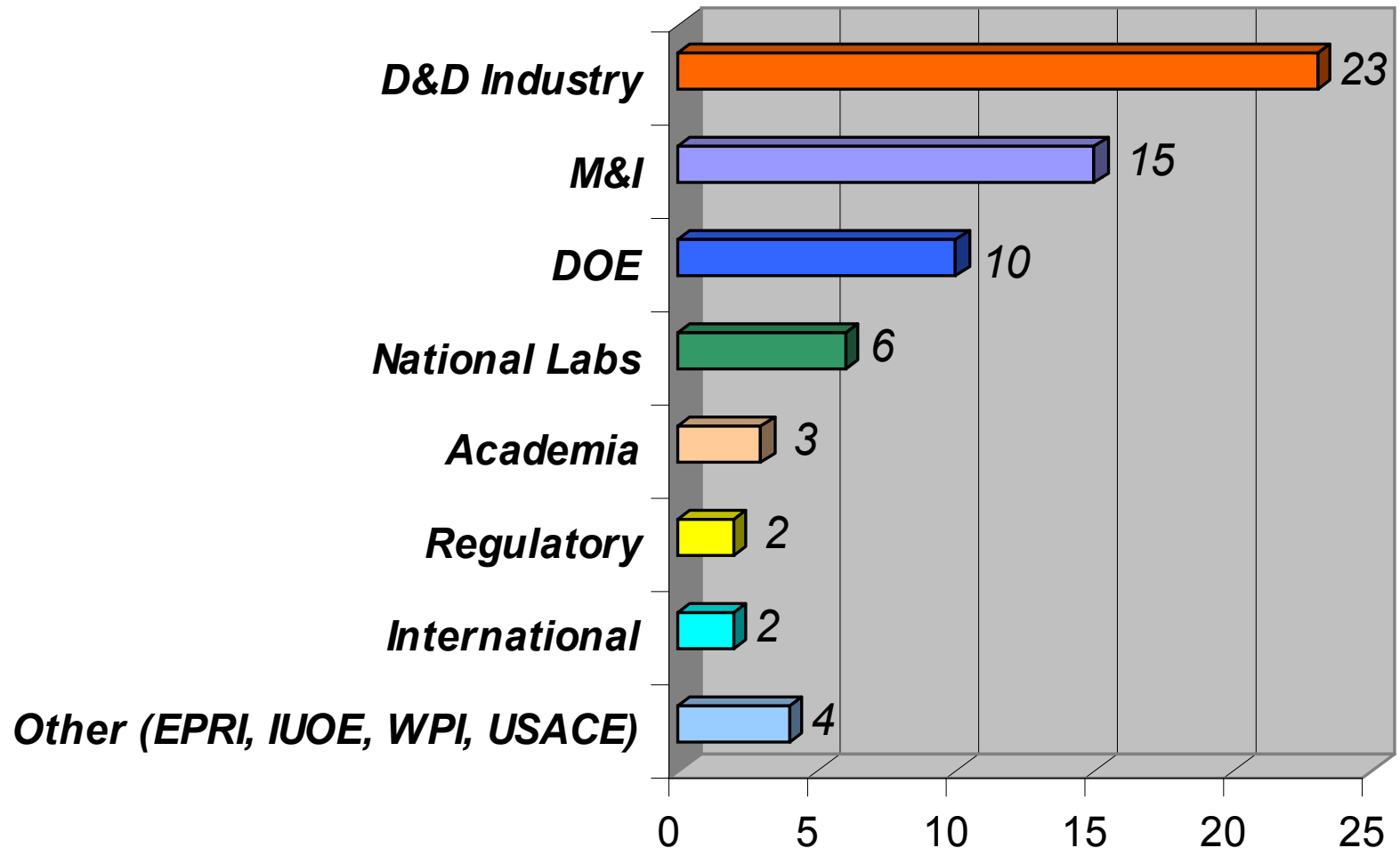


LSDDP Success

LSDDP	Location	Facility Type	Demonstrations	Deployments	Total Deployments
Oversize TRU Metal	LANL	Gloveboxes	8	3	4
Tritium D&D	Mound	Tritium Facilities	16	7	17
Canals and Associated Facilities	INEEL	Fuel Storage Pools	17	13	68
Chicago Pile 5 Research Reactor	ANL	Research Reactor	23	12	80
105 C Production Reactor	Hanford	Production Reactor	20	16	61
Plant 1	Fernald		13	7	70
321-M Fuel Fabrication Facility	SRS	Uranium Processing	5	2	3
		Totals	102	60	303



Integrating Contract Team Participants



Industry Partners in LSDDPs

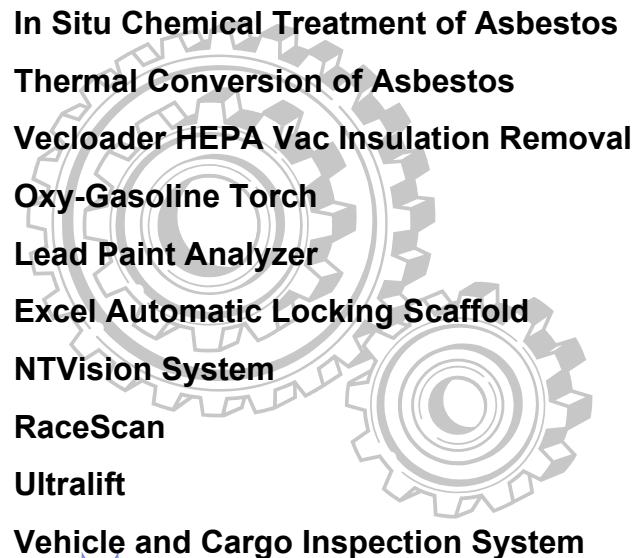
3M New Products Dept	Excel Modular Scaffolding & Leasing Corp	RadElec Inc.
Active Environmental Technologies	FRHAM Safety Products	Radiological Services Inc
AEA Technology Engineering Service, Inc	G/O Corp	RedHawk Environmental
AIL Systems Inc	Geoprobe Systems	RedZone Robotics, Inc
Berkeley Nucleonics Corporation	Infrared, Inc	Rowland Machinery
BetaScint Inc	Inuktun Services Ltd	Rumsey Electric
Bio Scan, Inc.	IT Corp	S B Power Tool co
Bluegrass Concrete Cutting Inc	Kappler Corporation	S. A. Robotics
BNFL Instruments, Inc	Lukas Rescue Team, Inc	Safety West
Brokk	MAR-COM Inc.	Science & Engineering Associates
Canberra Industries Inc	Marcris International Limited	Science Applications International Corp
Concrete Cleaning Inc	Matrix Surface Technologies	Shonka Research Assoc
Container Products Corp	Mega-Tech Services, Inc.	Solutient Technologies, LLC
Convolve Inc	Millennium Services, Inc.	Spectro Analytical Instruments
CS Unitec Inc	Mini-Mitter	Thermo Noran
DAMAS Corp	MSC Manufacturing Sciences Corp	Transport Plastics, Inc
Delphinus Engineering Inc	Niton Corp	Tri Tool Inc
DTI, a Division of Med-Eng Systems, Inc	Nochar, Inc.	TSA Systems
Duane Equipment Corporation	NUKEM Nuclear Technologies	Urethane Foam Specialties
Eagle Tech.	Pacific International Grout Co	Vector Technologies Ltd
Eberline Services, Inc.	Pentek Inc	Williams Power Corp.
Everest VIT, Inc.	Petrogen International, Ltd	



Technologies Demonstrated in LSDDPs

- ~ 91% of LSDDP demonstrated technologies are from industry
 - ~ 12 % of the industry developed technologies are International
 - ~ 10 % developed through “non-nuclear” industrial community
- ~ 9 % developed through the National Laboratories

Non Nuclear




In Situ Chemical Treatment of Asbestos
Thermal Conversion of Asbestos
Vecloader HEPA Vac Insulation Removal
Oxy-Gasoline Torch
Lead Paint Analyzer
Excel Automatic Locking Scaffold
NTVision System
RaceScan
Ultralift
Vehicle and Cargo Inspection System

International



Personal Ice Cooling System
Concrete Shaver
Remote Control Demo Syst (BROKK)
In Situ Underwater Gamma Spect.
Remote Underwater Charact (RUCS)
Envac Corner/Wall Scabbler
PCB Analyzer
Nukem Copper Recycling
Russian 3D Gamma Camera
Russian Isotopic Identification Device
Gamma Ray Imaging System

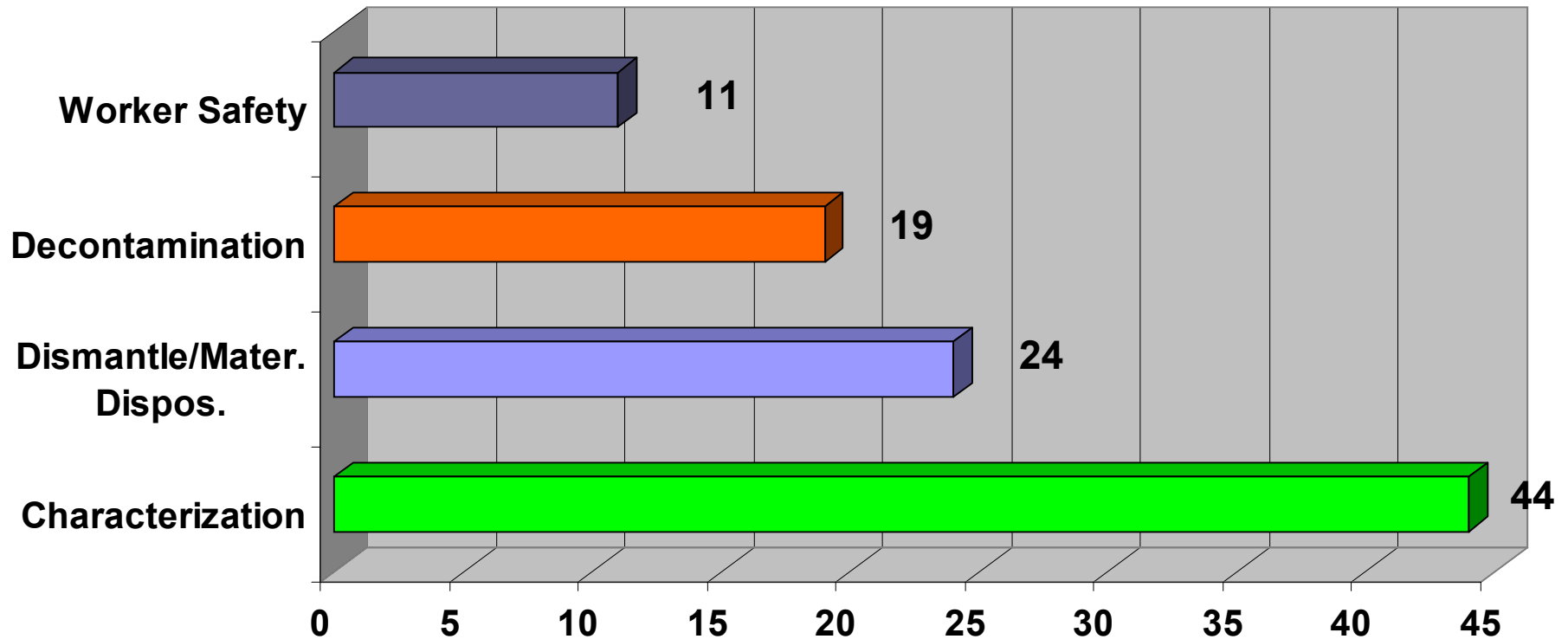
National Labs



X-Ray, K-Edge Heavy Metal Detection
DAWP
MACS
Swing-Reduced Crane Control
Field Transportable Beta Spect.
Laser Induced Fluorescence Imaging
RESRAD-Build
Concrete Spaller



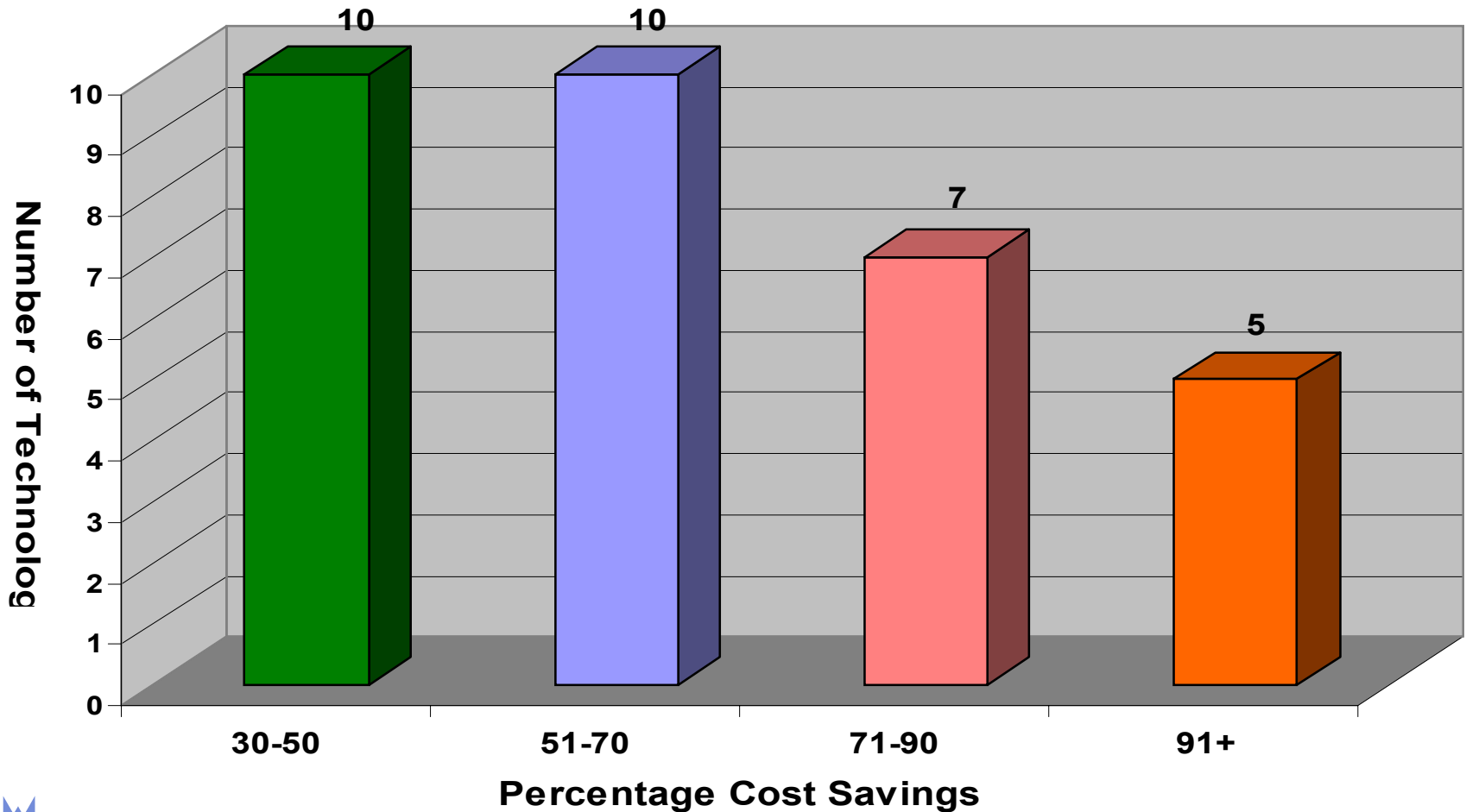
LSDDP Technologies



LSDDP Technologies by Category

D&D Technology Cost-Effectiveness

Cost Comparison Savings of D&D Technologies vs. Baseline



Mound Tritium Facilities LSDDP

The Mound Tritium Facilities LSDDP identified, demonstrated, and evaluated improved technologies applicable for the D&D of tritium facilities.

D&D of Mound's surplus tritium facilities, the T and R/SW Buildings, provided the opportunity to compare, evaluate, and eventually execute improved D&D technologies alongside baseline technologies in an ongoing site D&D project.

Successful Technologies Deployed and Demonstrated at Mound

Burndy Lightweight Portable Crimper for Tubing and Pipe

NOCHAR Petro Bond® Absorbent Polymer Oil Solidification Agent

WaterWorks Crystals® Aqueous Liquid Solidification Agent



Mound Tritium LSDDP

Pipe Cutting and Crimping System



- Hand-held head weighs only 8 lbs and crimps up to 1" pipe diameter
- Output force of 12 tons at an operating pressure of 10,000 psi
- Employs an open C style head to facilitate placement on the tube, even in a cramped environment
- Creates a leak-tight crimp
- Gas emissions are greatly reduced
- Reduces worker exposure

Mound Tritium LSDDP

NOCHAR Absorbent Polymer

Oil Solidification

BENEFITS:

- *A single step process - does not require mixing*
- *Minimizes processing times by reducing handling, and having minimal setup times*
- *Reduced worker exposure (ALARA)*
- *Increased productivity & improved project schedule*
- *Provides an overall cost savings for treatment and disposal of tritiated oil*
- *Specific “custom” formulas easily developed*
- *Disposal / Shipping container can be preloaded with Petro Bond® at the factory*
- *Virtually no processing equipment required*



Mound Tritium LSDDP

WaterWorks Solidification



- Organic polyacrylate absorbent
- Can achieve weight ratios of 200:1 water to absorbent
- Non-toxic and non-biodegradable
- Highly resistant to radiation effects and withstands freeze/thaw test environments
- Single step process requires no mixing
- Little to no increase in volume when added
- Minimizes processing times by reducing handling and setup times
- Provides overall price reduction for treatment and disposal of tritiated water

INEEL Fuel Storage Canals and Underground Facilities LSDDP

The INEEL LSDDP was extensive and included Test Reactor Area TRA-660, the TRA Filter Pit system, and the TAN-620 Initial Engine Test Control Room. Technologies were demonstrated in the areas of underwater inspection, characterization, and dismantlement; inspection, characterization, and dismantlement in confined spaces; recycle of materials from D&D activities; removal of loose radiological contamination on walls, floors, piping, and equipment; removal of fixed radiological contamination on concrete; tank, vessel, and piping decontamination; lead plate radiological decontamination; and high-radiation exposure fields.

Successful Technologies Deployed and Demonstrated at INEEL

Alloy Analyzer (NITON® Model 800)

PCB Analyzer

In-Situ Underwater Gamma Spectroscopy System (ISUGS)

Remote Underwater Characterization System (RUCS)

Soft-Sided Waste Packaging System

Russian Gamma Locator Device (GLD)

Russian Isotopic Identification Device (IID)

INEEL LSDDP

SPECTRO XEPOS XRF Analyzer



- Uses Polarized X-Ray Fluorescence spectrometry
- Can detect elements from sodium to uranium
- By detecting Chlorine, can be used to detect PCBs in paint, soil, liquid, or smear samples
- Up to 20 times less sample material needed for analysis
- Requires approximately 10 minutes per sample for analysis
- Capital cost of \$65,000 is recovered after 65 samples

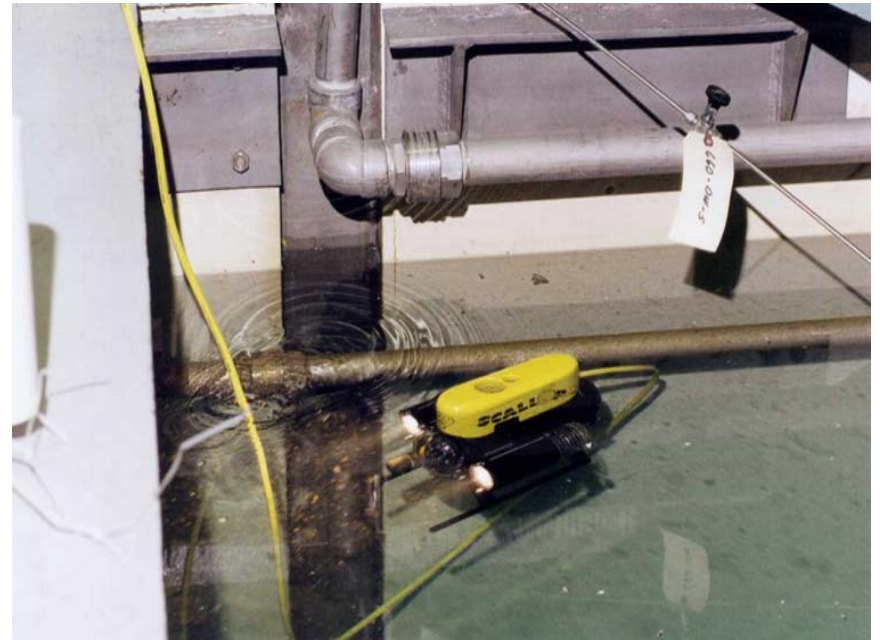
NITON XL-800 Spectrum Analyzer



INEEL LSDDP

Underwater Survey Tools

In Situ Underwater Gamma Spectroscopy



Remote Underwater Characterization System

INEEL LSDDP



Gamma Locator Device

- Provides near real-time radiological data
- Provides video with radiation overlay
- Remotely operated
- Reduced cost



Isotropic Identification Device

- Remotely operated
- Reduced labor costs
- Eliminates waste
- Real time radiological scans

INEEL LSDDP

Soft-Sided Waste Containers



- Packaging of low level waste
- Polypropylene outer shell and inner liner
- DOT IP-1 approved
- Three times greater capacity than wood or metal containers
 - 260 cubic ft compared to 96 cubic foot for metal boxes
- Holds up to 24,000 lbs.
- Can handle larger debris
- 70% cost savings compared to metal containers



Characterization Technologies

GLD & IID

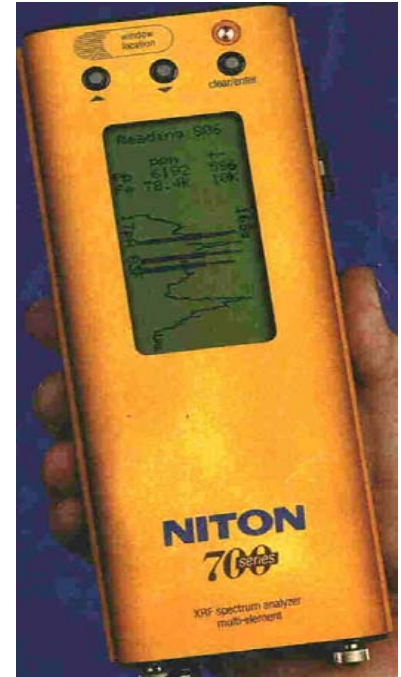


Gamma Cam™

Pipe Explorer™ System



Remote Underwater Characterization System



Lead Paint Analyzer

Vehicle and Cargo Inspection System

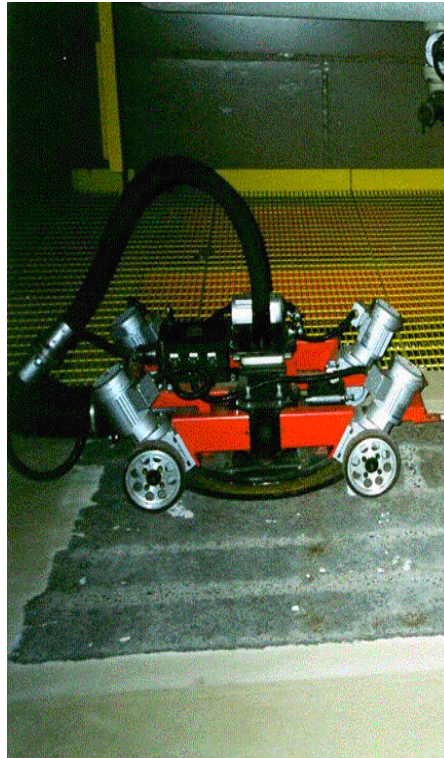


Decontamination Technologies



Fog and Strip

**En-Vac Robotic
Wall Scabbler**

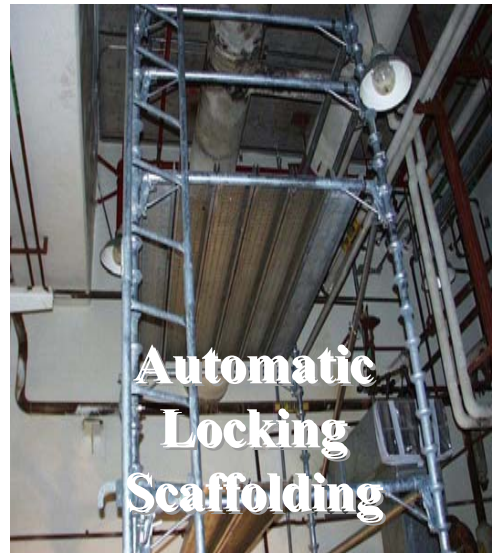
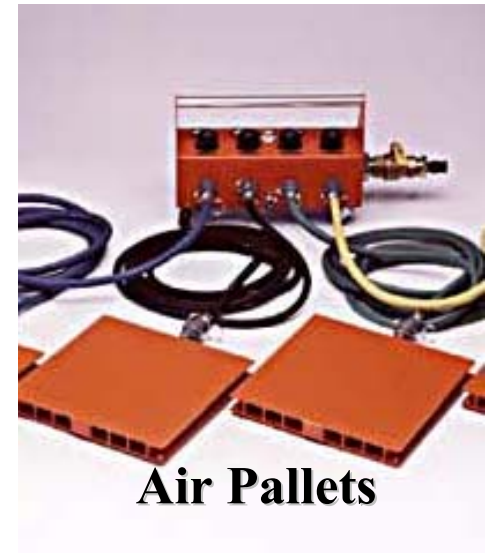
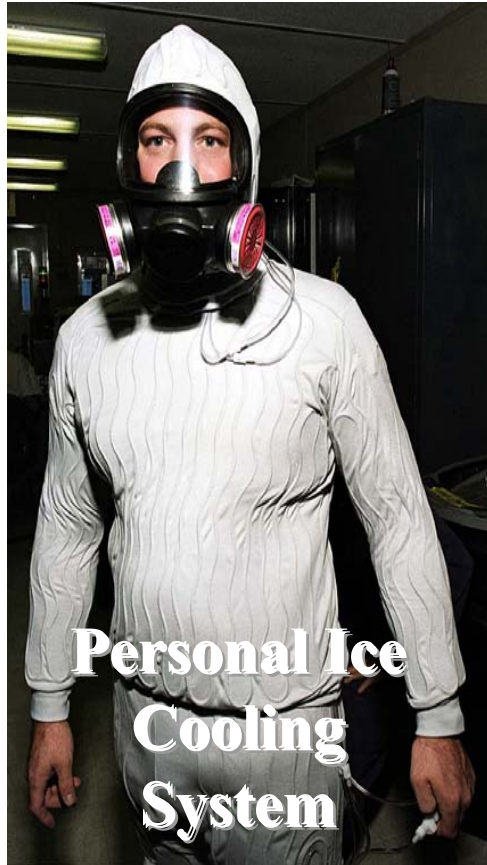


**Diamond Concrete
Shaver**

**Selective
Separation
Cartridge**



Worker Health and Safety Technologies



Dismantlement Technologies



ROSIE



**Oxy-Gasoline
Cutting Torch**



**Diamond Wire
Saw**



**Remote Concrete
Demolition System**



Material Disposition Technologies



VecLoader



Soft-Sided Waste Containers



Petrobond Oil Solidification Agent



Copper Cable Recycle



Conclusion

- **LSDDPs have validated cost benefits of improved D&D technologies**
- **LSDDPs have demonstrated over 32 improved D&D technologies that had over 30% cost savings compared to baseline**
- **Technology deployment is expected to reduce the \$39-plus billion mortgage by 25-40%**



EXTRA SLIDES



Technologies Replacing Baseline

Deployed Technologies

Innovative/Improved Technology	Baseline Technology
GammaCam	Manual Surveying
Surface Contamination Monitor	Manual Surveying
Personal Ice Cooling System	PPE
Pipe Explorer	Dismantlement
Automatic Locking Scaffolding System	Tube and Clamp scaffolding
Oxygasoline Torch	Oxyacetylene
Soft-sided Waste Containers	Wood or Metal Boxes
Remote Control Concrete Demolition System	Jackhammer/Cutting Torch
Concrete Grinder	Scabbler
Hand-Held Shear	Electric-powered hand-held reciprocating saws/band saws
Track-Mounted Shear	Electric-powered hand-held reciprocating saws/band saws



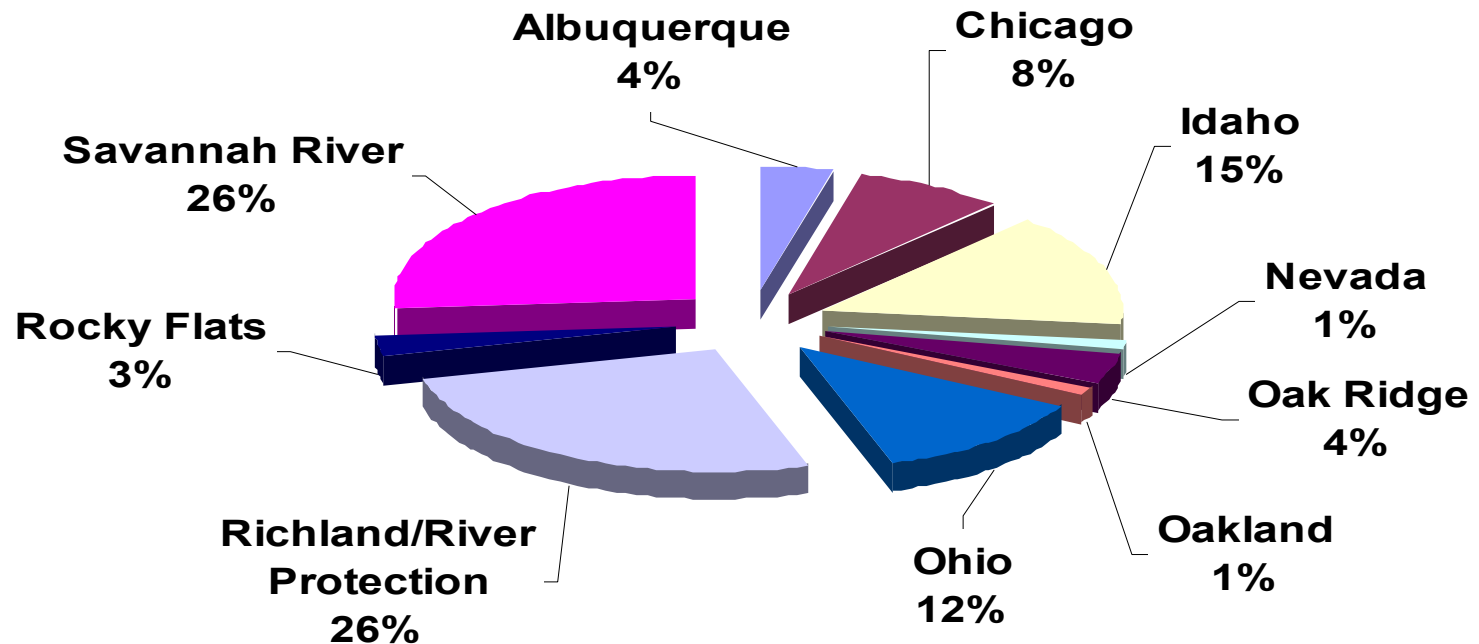
LSDDP Benefits

- **Reality check on baseline technologies through side-by-side demonstrations with innovative technologies**
- **Demonstration of technologies developed outside of EM-50**
- **Independent analysis of cost and other performance factors**
- **Promotion of creative solutions that expand the D&D “tool box” beyond standard practices and technologies**
- **Opportunities for technology vendors to immediately deploy technologies following successful demonstrations**
- **Direct transfer of innovative technologies to experienced D&D firms**
- **Demonstrations accomplish D&D work**



DDFA D&D of Innovative Technologies

D&D Deployments by DOE Field Office



DDFA Focuses on Results

D&D Deployments by DOE Field Office

